July 4, 1961 W. J. HANDZLIK, JR 2,991,082

GOLF CLUB

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Fig. 1

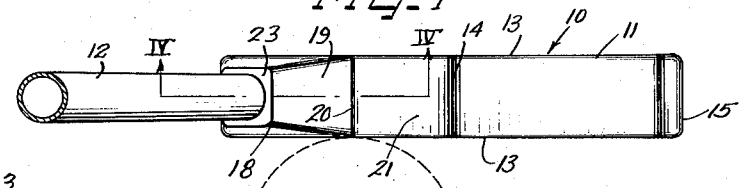


Fig. 2

Fig. 3

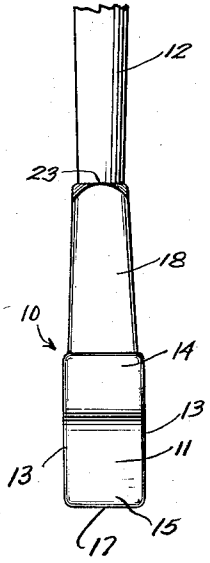


Fig. 5

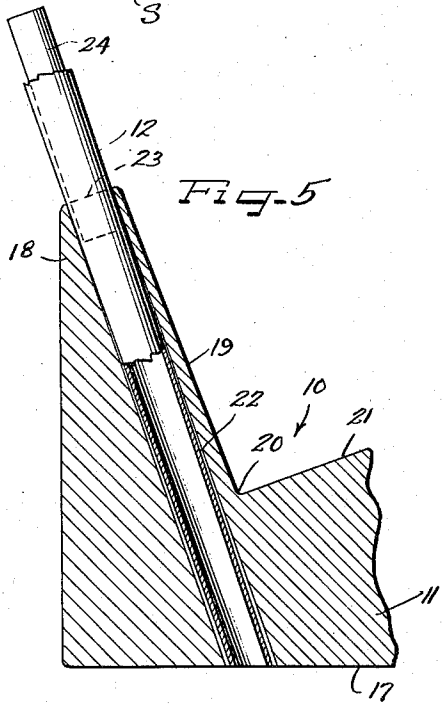
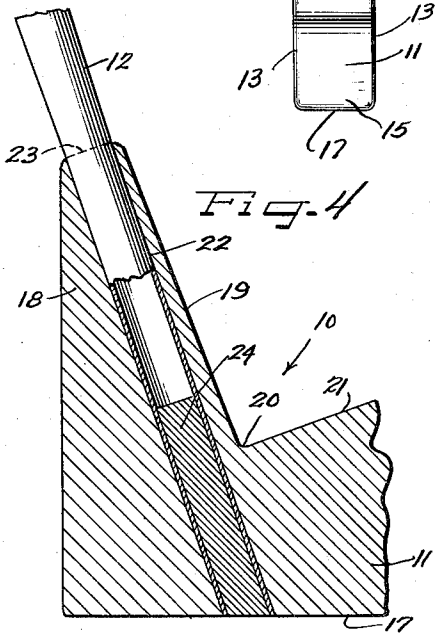


Fig. 4



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GOLF CLUB

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Fig. 6

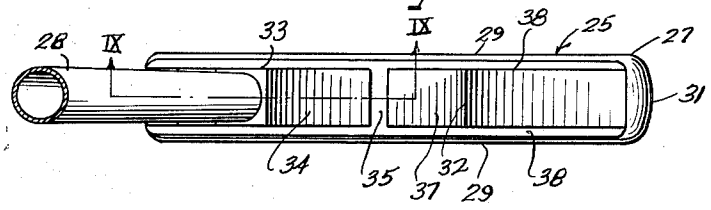


Fig. 7

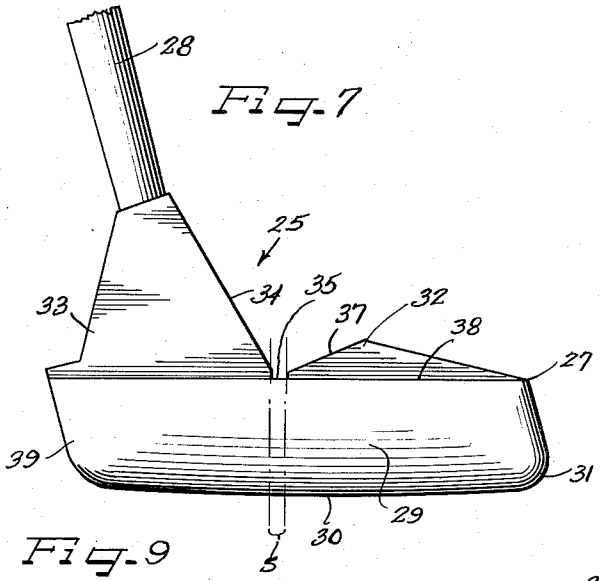


Fig. 8

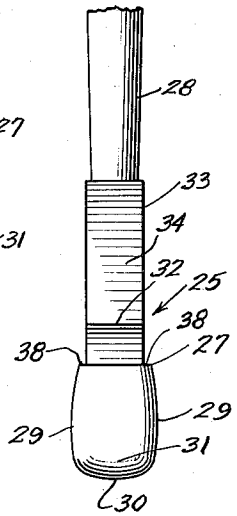
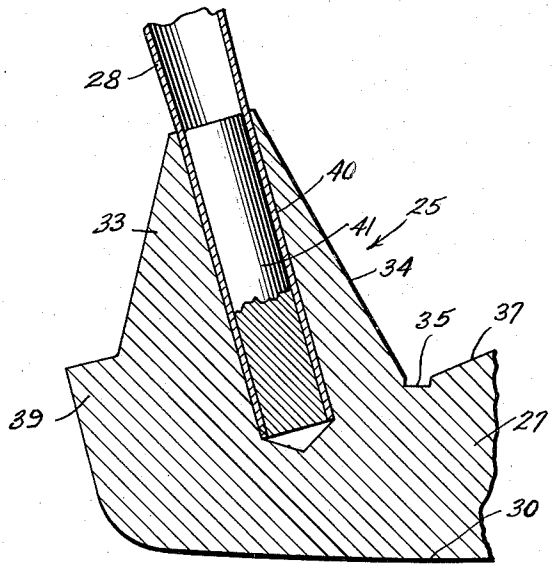


Fig. 9



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2,991,082

GOLF CLUB

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3 Claims. (Cl. 273—164)

The present invention relates to improvements in golf clubs and more particularly concerns a novel golf club structure which is especially suitable for golf clubs of the type known as putters.

In stroking a golf ball, accuracy of propulsion requires impact of the ball by the face of the club head as nearly as possible in line with the center of mass of the club head. That place on the club face which is thus in line with the center of mass is commonly referred to among golf enthusiasts as the "sweet spot." It is especially important in putting that the golf ball be stroked by the sweet spot of the putter face.

As golf clubs have heretofore been made, and especially putters, much practice has been required to attain utmost skill in the use of the particular club, especially to locate and make use of the sweet spot of any particular club in order to attain expert playing results. With putters, this is extremely important because of the great accuracy in travel of the golf ball over the green to the cup required for scoring.

It is accordingly an important object of the present invention to provide an improved golf club which is not only well balanced, but is provided with means for visual indexing of the sweet spot with reference to the golf ball.

Another object of the invention is to provide an improved golf club having novel means for indexing the proper point of stroke impact with the ball for accurate propulsion thereof.

A further object of the invention is to provide an improved golf club of especially uniformly balanced construction.

Still another object of the invention is to provide an improved golf club having a novel distribution of mass affording a substantial range of impact point variance from the sweet spot with nevertheless attainment of reasonable accuracy of propulsion of the ball during a stroke of the club.

Yet a further object of the invention is to provide an improved golf club which is especially suitable to be used ambidextrously.

It is also an object of the invention to provide a golf club in which the shaft and head are assembled in a novel manner.

In this connection, it is a still further object of the invention to provide an improved method of assembling a shaft with a golf club head.

Other objects, features and advantages of the present invention will be readily apparent from the following detailed description of certain preferred embodiments thereof taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a top plan view of a golf club but with only that portion of the shaft adjacent to the head of the club showing;

FIGURE 2 is a side elevational view of the golf club;

FIGURE 3 is a front elevational view of the golf club;

FIGURE 4 is a fragmentary enlarged sectional detail view taken substantially on the line IV—IV of FIGURE 1;

FIGURE 5 is a sectional view similar to FIGURE 4 but showing certain steps in the method of assembling the golf shaft with the head;

FIGURE 6 is a top plan view of a modification of the golf club;

FIGURE 7 is a side elevational view of the golf club of FIGURE 6;

FIGURE 8 is a front elevational view of the same; and

FIGURE 9 is an enlarged fragmentary sectional detail view taken substantially on the line IX—IX of FIGURE 6.

A golf club **10** (FIGS. 1–4) embodying the invention includes a head **11** and a shaft **12**. While the golf club head **11** is preferably substantially solid and made from a material of substantial density such as suitable metal, the shaft **12** is preferably of tubular form and of suitable material such as steel. By way of example, the golf club head **11** is of the putter type.

According to the present invention, the mass of the club head **11** is distributed in such a manner not only to enable use of the club ambidextrously, but also to locate the sweet spot with substantial accuracy. To this end, the club head mass is equally disposed on opposite sides of a longitudinal median plane as best seen in FIGURES 1 and 2 to afford equal opposite side playing faces **13**. Left-hand or right-hand players can thus use the club with equal proficiency.

By locating a pair of major mass portions of the club head **11** forwardly and rearwardly of a predetermined sweet spot location, identified at S between spaced parallel vertical dot dash lines in FIGURE 2, substantial advantages are attained. A major extent of the elongated club head projects forwardly from the sweet spot area S and is provided with an upwardly projecting hump portion **14** formed as a transverse ridge located closer to the sweet spot area S than the forward tip portion of the club head provided with a tip extremity **15** located adjacent to a bottom surface **17** of the club head for lowering the center of gravity of the club head.

In the rear portion thereof, the club head **11** has the rear mass portion disposed to project upwardly for not only shortening the rear portion of the club rearwardly of the sweet spot area S, but also for providing an upwardly elongated club shaft receiving boss or leg **18**. The club head **11** is thus of generally L-shape in side elevational profile. The combined mass of the rear portion **18** of the club head and the associated portion of the shaft **12** including all of the club head rearwardly of the sweet spot area S substantially equals all of the club head forwardly from the sweet spot area S.

As will be observed, the forward face of the upstanding rear portion **18** of the club head provides a downwardly and forwardly sloping surface **19** which converges in a transverse groove **20** aligned with the sweet spot S with a rearwardly and downwardly sloping surface **21** of the forward mass hump portion **14**. Both of the upstanding mass portions **14** and **18** are thus prominently delineated by the intervening groove **20** which thus serves as a convenient sweet spot index which is equally applicable to both of the faces **13** of the golf club head. Thus, as best seen in FIGURE 1, accurate orientation or indexing of the club head with respect to a golf ball, as indicated by the circular dash outline B to center the sweet spot on the golf ball is conveniently visually accomplished through the medium of the indexing groove **20**.

It may be noted that although ideally stroking of the ball B is through the sweet spot S as indexed by the index means groove **20**, the advantageous forward and rearward weight distribution relative to the sweet spot affords a substantial range of reasonably accurate stroking forwardly and rearwardly from the sweet spot, as indicated by the two extreme respectively forward and rearward locations of the ball outline B in FIGURE 2. In other words, there is little tendency for the club head to twist on impact of the club face with the ball as long as it is within the range to the sweet sport side of a vertical plane transversely through the peak **14** and the topmost

projection of the shaft boss mass **18**. The present club structure is therefore highly stable in play, and because of its substantial sweet spot range, greatly reduces the margin of error with respect to direction of propulsion of the golf ball stroked thereby.

Assembly of the shaft **12** with the club head **11** is effected with respect to the shaft boss rear mass portion **18** in such a manner as to coact with such mass boss to afford a balanced mass distribution relative to the mass of the club head forwardly from the index groove **20**. To this end, the club shaft extends on an axis diagonally forwardly down through the upstanding boss **18** with the lower end portion of the shaft fixed within a bore **22**. In the present instance, the bore **22** extends entirely from the top of the boss **18** through the bottom surface **17** of the club. To facilitate drilling of the bore **22** on the proper diagonal angle, the top of the boss **18** is provided with a crown surface in a rearwardly sloping plane which is normal to the desired axis of the bore **22**.

As is customary, the tube of the club shaft **12** is tapered downwardly. This is taken advantage of in effecting assembly of the shaft with the club head. The bore **22** is made of a cylindrical diameter substantially equal to the outside diameter of a portion of the shaft **12** that is encompassed by the upper end of the club head boss **18** when the shaft is projected into the bore **22** from the top end thereof and to the bottom of the bore. In this relationship, as best seen in FIG. 5, the outside diameter of the shaft **12** diverges to a smaller diameter at the bottom of the bore **22** than the bottom end portion of the bore. Assembly of the lower end portion of the shaft **12** into the bore is thus effected without resistance.

Following initial assembly of the shaft **12** into the bore **22**, the portion of the shaft encompassed within the bore is expanded and locked into thorough frictional engagement with the wall of the bore throughout the length of the bore. In a convenient manner, this is accomplished by driving an elongated cylindrical interlock member **24** longitudinally down through the lower end portion of the tubular shaft. The diameter of the plug member **24** is less than the inside diameter of the shaft **12** above the bore encompassed portion of the shaft, but is of a diameter less than the diameter of the bore **22** equivalent to the thickness of the tubular material of the shaft. Thereby, after the shaft has been preliminarily assembled within the shaft bore **22**, or before the shaft is so assembled, the plug member **24** is dropped into the shaft from the upper end thereof and will lodge above the end of the shaft lower end portion where the normal inside diameter of the shaft becomes smaller than the diameter of the plug member. Then, with the lower end portion of the shaft inside the tube **22**, longitudinal downward pressure by means of a suitable tool or driving mandrel applied to the upper end of the plug member **24**, drives the same down the lower end portion of the shaft, causing such shaft end portion to expand into tight engagement with the wall of the bore and until the plug member **24** has been driven to the bottom of the shaft and by preference with the lower end portion of the plug member projecting beyond the bottom face **17** of the club head. Any projecting lower end portion of the plug member and possibly also of the shaft is ground off flush with the bottom face **17**. As a result of the assembly operations described, the outside diameter of the lower end portion of the shaft **12** is thoroughly frictionally grippingly engaged with the entire length of the bore **22**. This taken together with the locked condition maintained by the plug **24** as seen in FIG. 4, clampingly gripping the lower extremity portion of the shaft between the plug member and the wall of the bore assures thorough retention of the club head on the shaft.

Moreover, in a putter flexibility in the club shaft should be minimized, and the substantial length of the shaft incased in the elongated upstanding boss portion **18** of the club substantially contributes to the non-flexing efficiency of the shaft for this purpose.

In the modified form of club **25** shown in FIGURES 6–9, similar structure functioning in a similar manner as in the club **10** is provided, with certain refinements. To this end, the club **25** which is also preferably in the form of a putter type of club, comprises a club head **27** carried by a tubular shaft **28**. In this instance, the club head **27** is of elongated form similarly as the club head **11**, but club faces **29** on the opposite longitudinal sides of the club head, enabling the club to be used ambidextrously, are of convex form vertically for enabling more even roll of the stroked ball and thus permitting truer line or straight propulsion of the ball over the green. By preference, the club faces **29** merge on smoothly rounded contour with a bottom surface face **30** which is convexed transversely and also preferably slightly convexed longitudinally as best seen in FIGS. 7 and 8.

For better balance and location of sweet spot S', a forward and rearward mass distribution along generally similar lines as in the club head **11** and for the same purpose is provided in the club head **27**. For this purpose, the tip of the club head provides a forward projection **31** along the lower forward side of the club head. An upwardly projecting mass ridge **32** on the forward and longer end portion of the club head balances out with respect to an upwardly projecting mass and club shaft receiving boss portion **33** on the shorter rear end portion of the club head. A forwardly and downwardly sloping forward face **34** on the boss portion **33** converges into a groove **35** with a rearwardly and downwardly sloping surface **37** on the ridge portion **32**. The groove **35** is indexingly coincident with the sweept spot area S' and extends transversely across the top of the club head.

In order to emphasize the groove **35** for indexing purposes, it is preferably formed as a flat horizontal surface in a plane with longitudinally running upper marginal surfaces **38** along each side of the top of the club head along the bases of the ridge **32** and the boss **33** and providing a generally elongated H-shaped top surface as best seen in FIG. 6.

In this instance, the rear upstanding boss portion **33**, which similarly as the boss portion **18** affords a generally L-shaped side elevational profile for the club head, is of relatively smaller mass than the boss portion **18** and to compensate for this the rear end portion of the club head **27** is projected rearwardly beyond the boss portion **33** as a heel portion **39**.

In balancing the mass of the portion of the club head **27** rearwardly relative to the sweet spot area S', the lower end portion of the shaft **28** is disposed at a proper predetermined angle diagonally downwardly and forwardly in the boss portion **33**, being anchored within a bore **40** by means of a driven plug **41** assembled therewith similarly as described in connection with the plug **24**, even though the bore **40** is blind end as shown as contrasted to the through bore arrangement in the club head **11**.

With respect to both of the club heads **10** and **27**, the converging sloping surfaces forwardly and rearwardly from the respective indexing grooves may be finished to enable visual concentration upon the indexing groove. For example, with respect to the club head **11**, where the converging surfaces **19** and **21** are of polished or plated metal, high lights and shadows afforded thereby emphasize the intermediate transverse groove **20**. With respect to the club head **27**, contrasting coloration of the flat faced groove **35** with respect to the converging surfaces **34** and **37** affords a desirable attention arresting and concentration aid. Desirable effect may also be had by differentiating coloration of all of the surfaces of the ridge **32** and the boss **33**. For example, where the surfaces of the ridge **32** including the face **37** and the surfaces of the boss **33** including the face **34** are finished

in a flat black color as compared to white coloration of the surface of the groove 35 and the surfaces 38 joining the same, a highly contrasting attention arresting, focusing and indexing concentration effect is provided.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. A golf club structure including a generally horizontally elongated club head of generally greater height than width and having a rear upwardly projecting shaft boss mass portion, a shaft secured in and projecting upwardly from said boss mass portion, an upwardly projecting mass hump ridge portion on the club head forwardly from said boss mass portion and substantially balancing said boss mass portion and the portion of the shaft therein, said mass portions having converging surfaces meeting substantially in line with the center of mass of the club head and defining therebetween a mass separating groove visible from above to identify the sweet spot area of the club face, said mass portions having the centers thereof disposed substantially spaced longitudinally of the club head from said groove and said sweet spot and thereby substantially stabilizing impact force on the club face forwardly and rearwardly from the sweet spot as indexed by said groove and between said mass centers so as to avoid tendency of the club head to twist on impact of the club face with a ball as long as such impact

is within a range to the sweet spot side of a vertical plane transversely through the centers of said masses.

2. A golf club structure as defined in claim 1, wherein said groove has a flat horizontal surface adapted for contrasting coloration with respect to said converging surfaces to afford an attention arresting and concentration aid.

3. A golf club structure as defined in claim 2, wherein the top of the golf club head has along the bases of the mass portions longitudinally running upper marginal surfaces providing with said groove surface a generally H-shape and also adapted for contrasting coloration for attention arresting, focusing and indexing concentration effect.

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